

CLAIMS

WE CLAIM

1. A device for moving a fluid, comprising a movable member having a first piezoelectric actuator element coupled thereto to drive said movable member to move said fluid and a second piezoelectric sensing element coupled thereto to provide feedback related to a fluid parameter.
2. The device of claim 1 wherein said second piezoelectric sensing element provides feedback related to fluid viscosity.
3. The device of claim 1 wherein said second piezoelectric sensing element provides feedback related to fluid density.
4. The device of claim 1 wherein said second piezoelectric sensing element provides feedback related to fluid temperature.
5. The device of claim 4 wherein said second piezoelectric sensing element has a thermal expansion coefficient different from that of said first piezoelectric actuator element.
6. The device of claim 1 wherein said movable member is a flexible member.
7. The device of claim 1 wherein said movable member is a flexible blade.
8. The device of claim 1 further including a controller to receive said feedback, said controller controlling operation of said device in response to said feedback.
9. The device of claim 8 including a power source controlled to provide a power output signal in response to said feedback.
10. The device of claim 8 wherein said controller has calibration data stored in memory relating said feedback to said fluid parameter.

11. A method of operating a piezoelectric device for moving a fluid, comprising moving a movable member using a first piezoelectric actuator element on said movable member and providing feedback related to a fluid parameter from a second piezoelectric element on said movable member.

12. The method of claim 11 wherein said second piezoelectric sensing element provides feedback related to fluid viscosity.

13. The method of claim 11 wherein said second piezoelectric sensing element provides feedback related to fluid density.

14. The device of claim 11 wherein said second piezoelectric sensing element provides feedback related to fluid temperature.

15. The method of claim 14 including providing said second piezoelectric sensing element with a thermal expansion coefficient different from that of said first piezoelectric actuator element.

16. The method of claim 11 further including controlling operation of said device in response to said feedback.

17. The method of claim 11 including storing calibration data relating said feedback to said fluid parameter in memory of a controller.